

THE DIRECTOR OF
CENTRAL INTELLIGENCE

National Intelligence Council

17 June 1985

DAY, JUNE 14, 1985

Scientists

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Enclosure:

"Star Wars and the Scientists"
by Gregory Fossedal, The Wall
Street Journal, June 14, 1985

Identical note to:

Charles Douglas-Home
Lord Chalfont

leading scientists. Then he began to check their calculations "on my own and with the help of colleagues." Last spring he attacked those critics in Commentary. Yet he talked only of a research program, and voiced doubts about such technologies as the "smart rock" or hit-to-kill missile suggested by the High Frontier lobbying group and successfully tested last June. Now, he says a smart rock defense could block 90% or more of a Soviet attack and should be started now.

Pans Before Analysis

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"I don't like signing something like that unless I have studied it," he told me this week. "People pay too much attention to Nobel Laureates who have little expertise in what they're signing."

Robert Wilson, who shared the Nobel with Mr. Penzias for detecting a radiation cloud that supports the "Big Bang" theory of the universe, did sign the UCS letter. But, he says, "I don't know anything about the Soviet ABM program or our missiles or theirs. I just have the sense of too many weapons up there, and we should keep them out of space if we can."

On the technical side, by contrast, Mr. Wilson says, "I'm sure we can make some kind of defense work. . . . Star Wars is sound and moving ahead fast technically, but we need to be careful in approach. . . . I'm mostly concerned about all those nuclear weapons." And if we build down offensive weapons while building up defense? "Oh, that would be a good idea."

Many colleagues still respect the critics—particularly Mr. Bethe—as scientists. "They've acknowledged it" when they make technical errors, says Jonathan Katz, who participated in a National Academy study of nuclear winter. "Bethe is a great scientist. But the debate is over the assumptions you make about the Soviets, and the criterion you use to judge a defense: How effective does it have to be? There's really no scientific question . . . it's a strategic and political judgment."

Mr. Nierenberg says the critics have "deliberately obscured" that distinction. Mr. Seitz goes further and says the whole debate, to this point, "has done great damage to science" and laments that "too many of us have been afraid to speak out."

Who Should Speak?

Mr. Bethe told me seven months ago that "the dispute isn't primarily scientific," since the key issues now revolve around such political-strategic questions as how the Soviets will react. The debate, Harvard's Ashton Carter told the Economist recently, should be over the utility of less-than-perfect defenses, which Mr. Carter agrees are plausible. Even such imperfect defenses, Mr. Carter wrote last year, could render nuclear weapons "impotent and obsolete"—if they can knock down nuclear weapons for less money than it costs the Soviets (or Libya, China, Syria . . .) to build them.

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THE WALL STREET JOURNAL FRIDAY, JUNE 14, 1985

Star Wars and the Scientists

By GREGORY A. FOSSEDAL

Supporters and critics alike were taken aback recently when James Fletcher, the former head of the space program, assessed the Star Wars defense idea in an article in *Issues in Science and Technology*. His conclusion: The U.S. can defend, in the 1990s, between 90% and 99% of its "population and infrastructure," with more exotic technologies providing a "near perfect" system shielding 99% or more of our people from an all-out nuclear attack. Head of a 1983 panel that evaluated Star Wars technologies, Mr. Fletcher has the respect of supporters and opponents alike.

Mr. Fletcher is part of a broad emergence—in some cases a shift—in thinking among scientists since Ronald Reagan called for a defense to make nuclear weapons "impotent and obsolete." Of course, when one says "scientists," one means chiefly theoretical physicists at MIT or Cornell. The typical Boeing engineer or applied-electronics man in Silicon Valley—who probably has more expertise in this area than, say, Carl Sagan—supported Star Wars all along.

Two scientists who generally support strategic offensive programs, but had initial doubts about defense, are Reagan adviser George Keyworth and Dartmouth physicist Robert Jastrow. In 1982, defending the administration's "dense pack" plan for MX, Mr. Keyworth told reporters even a limited defense was unfeasible until the 21st century. In a New York Times column, he attacked notions of "abandoning mutual assured destruction for a posture of mutual assured survival." Today he is the White House point man on defense.

Mr. Jastrow, too, came to Star Wars via the Reagan buildup, which he defended in a March 1983 article for *Commentary*. Mr. Jastrow had questions about strategic defense after the program was assailed by leading scientists. Then he began to check their calculations "on my own and with the help of colleagues." Last spring he attacked those critics in *Commentary*. Yet he talked only of a research program, and voiced doubts about such technologies as the "smart rock" or hit-to-kill missile suggested by the High Frontier lobbying group and successfully tested last June. Now, he says a smart rock defense could block 90% or more of a Soviet attack and should be started now.

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Other substantial supporters abound but simply are not mentioned: Fred Seitz, former president of the National Academy of Sciences, and Bill Nierenberg, director of the Scripps Institute for Oceanography and head of the Jason's panel that debates key issues of defense science for the government. Then there are the heroic young entrepreneurs—Lowell Wood, Gregory Canavan and others—who are carrying out the actual research on Star Wars.

One reason we have heard little from these men is that they have not been talkative. Richard Garwin and Mr. Sagan were quoted days after the Reagan Star Wars speech panning the idea—before they could possibly have given it thorough analysis. By contrast, Mr. Seitz says, "I didn't know enough about it to comment. . . . I was interested way back in the 1960s, when we were only talking about a very limited defense. . . . With Mr. Reagan's idea we're really talking about something much bigger than I hadn't studied." After briefings at Los Alamos and Livermore, Mr. Seitz concluded, "We have moved ahead since then. We ought to go all-out."

Mr. Nierenberg says: "The fact that Garwin says something won't work is very

little evidence. Historically scientists are the worst at predicting scientific advances," he says, citing experts who ruled out the airplane, intercontinental missile and, of course, the nuclear bomb that Mr. Reagan would try to make obsolete.

To their credit, Star Wars critics have made major concessions. The most famous of these is on the "constellation issue," i.e., the question of how many satellites it would take to knock down a given Soviet attack. Office walls in the Pentagon now sport a chart detailing how, over time, Mr. Garwin and the Union of Concerned Scientists (the chief lobby against Star Wars) have reduced their original estimate of 2,400 satellites, to counter the present Soviet force, to fewer than 100. The plunging line is known as "the Garwin curve."

Then there is the "square root law" derived by Mr. Canavan. This asserts that

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as the Soviets expand their missile force by, say, a factor of four, the U.S. can meet that threat by expanding its defense only by, roughly, the square root of four—or two. The intuitive proposition is that there are economies of scale in knocking down Soviet attacks, as in most other enterprises. Mr. Canavan started with papers by Star Wars critics, corrected for some flawed modeling, and derived the square-root law. If he is right, Star Wars defenses would be ruinously expensive not for the U.S., but for anyone who tried to counter them with an offensive buildup.

Still widely respected as a scientist, even by Star Wars supporters, is Hans Bethe. Mr. Bethe now concedes his colleagues were wrong in a number of initial arguments. "We were wrong" on constellation size, Mr. Bethe wrote me last fall. Now, after receiving the briefings Mr. Seitz has, Mr. Bethe concedes the group was probably wrong about the lethality of the X-ray laser that might be used to zap nuclear missiles. Wrong on the weight of potential components that must be lifted into space. Wrong about potential power output by certain kinds of lasers. And wrong to dismiss smart rocks with a few paragraphs: Mr. Bethe says this is probably "the best" approach to defense for the foreseeable future.

Has the evidence changed Mr. Bethe's mind? We talked in Cornell recently. He said, "You know what I think." Well, yes—but at least it is clear that what he thinks stems from something other than the laws of physics. In a letter to the New York Times June 11, he raises no specific technical flaw with Star Wars. Instead he restates the obvious—that a defense must be survivable—and goes on to offer his view of the test ban treaty, Geneva negotiations, and "arms race in space." In other words, his objections are more strategic in character than scientific.

Some who voice no opinion on Star Wars are now critical of colleagues who have dragged science down to a partisan level. Nobel winner Arno Penzias of Bell Labs declined to sign a recent attack on Star Wars issued by the Union of Concerned Scientists. He says UCS materials

are "more rhetoric than science." Mr. Penzias agrees with many UCS stands but dislikes its tactics. "Once you take a scientific issue and look at it as a battle you're going to win, you no longer have the right to call yourself a scientist."

"I don't like signing something like that unless I have studied it," he told me this week. "People pay too much attention to Nobel Laureates who have little expertise in what they're signing."

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Yet this is what Star Wars supporters have said all along. Is there now a technical consensus? Should the debate be handed over to politicians, journalists and generals, to the exclusion of physicists?

Hardly. If anything, scientists have played too little a role—because they have squandered their efforts on issues where they truly have no knowledge. While issuing dictums on the ABM Treaty, Soviet foreign policy and so on, scientists have left specific scientific points unanswered.

And journalists have let them. Probably, the press should spend less time with the "political scientists" both for and against Star Wars. And a little more time talking to the people, such as Messrs. Fletcher and Canavan, who haven't said much about Star Wars—because they have been too busy actually studying it.

Mr. Fossedal is a Journal editorial-page writer.